

Figure 1

004160" 11229960

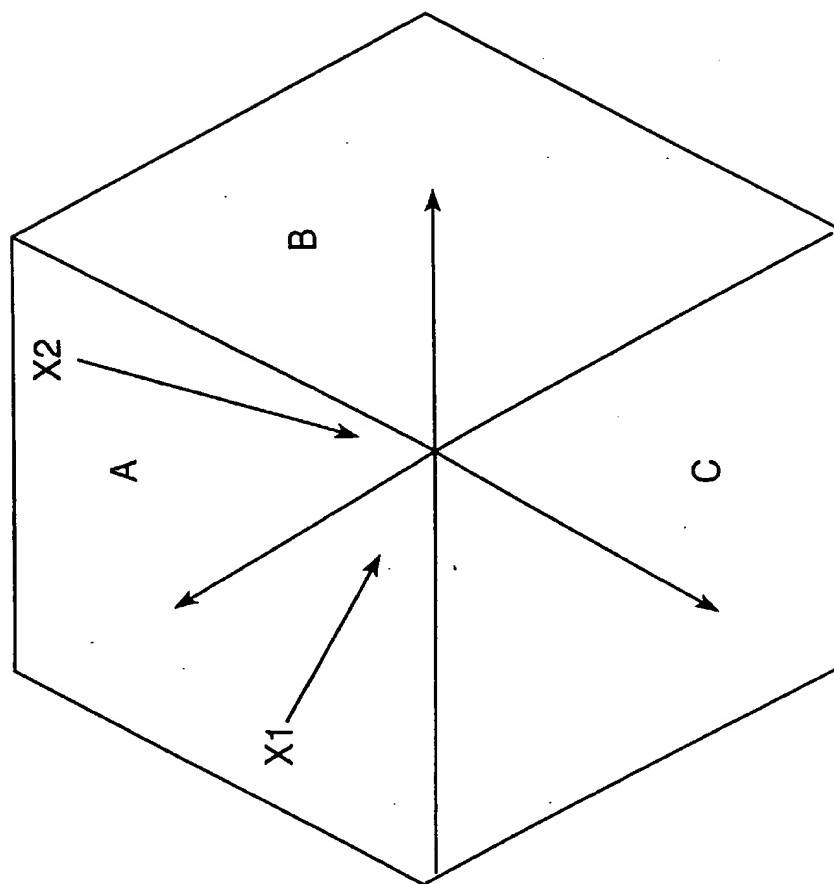


Figure 2

004160" T429960

| PARAMETER | VALUE |
|--|---|
| 1. THREE, FOUR, SIX OR EIGHT SECTOR CELL DIVISION,& MORE CAN BE USED | 120°, 90°, 60°, OR 45° COVERAGE PER SECTOR RESPECTIVELY |
| 2. CELL DIMENSIONS | 2 KM RADIUS, COMMUNICATION RANGE, 1 KM TYPICALLY WITHIN THE CELL, AND 1 KM BEYOND THE NORMAL CELL BOUNDARY |
| 3. RAIN FADE | 7 dB/KM, 14 dB TOTAL |
| 4. FOLIAGE ATTENUATION | 10 dB TO 20 dB ASSUMED PER TREE. OVER COME BY USE OF BASE STATION DIVERSITY |
| 5. REQUIRED HUB TO SUBSCRIBER C/(NO+1) | 7 dB |
| 6. REQUIRED SUBSCRIBER TO HUB C/(NO+1) | 7 dB |
| 7. HUB ANTENNA GAIN | 13.5 dB, 15dB, 16.5dB, & 18dB FOR 120°, 90°, 60°, AND 45° COVERAGE, 3 dB BEAM WIDTHS RESPECTIVELY. |
| 8. SUBSCRIBER ANTENNA GAIN | 35 dB, 3.8 DEGREE, 3 dB BEAM WIDTH IN ALL CASES |
| 9. HUB TRANSMIT POWER | 1 W |
| 10. SUBSCRIBER TRANSMIT POWER | 100 mW TO 200 mW |
| 11. DOWN STREAM DATA RATE | 10 Mbps INITIALLY, 51 Mbps FUTURE REQUIREMENT |
| 12. UP STREAM DATA RATE | T1 (1.024 Mbps) INITIALLY, 10Mbps TO 51 Mbps FUTURE REQUIREMENT |
| 13. DOWN STREAM FREQUENCY BAND | 27.5 GHz TO 28.35GHz, 850 MHz TOTAL |
| 14. UP STREAM FREQUENCY BAND | 29.1 GHz TO 29.25 GHz 150 MHz TOTAL |
| 15. SUBSCRIBER POPULATION PER CELL OF 1 KM RADIUS | 1000 TOTAL SUBSCRIBERS, 60% TO 85% TO BE SERVICED. POPULATION TO BE SERVICED CAN BE INCREASED BY INCREASED CELL SECTORIZATION AND THE USE OF POLARIZATION DIVERSITY. |
| 16. FREQUENCY RE-USE | FREQUENCY RE-USE OF 1 ACHIEVABLE WITHOUT POLARIZATION DIVERSITY WHEN USING THE OPTIMAL CELL CONFIGURATION FOR BOTH RECTANGULAR AND HEXAGONAL ARRAYS. FREQUENCY RE-USE OF 1 ACHIEVABLE WHEN OPERATING IN A DISADVANTAGED CELL ARRAY THROUGH THE USE OF POLARIZATION DIVERSITY. |
| 17. INTERFACE TO GEOGRAPHICALLY REMOTE CELLS | SATELLITE LINK BETWEEN HEAD END AND BASE STATION OF GEOGRAPHICALLY REMOTE CELLS CAN BE PROVIDED WITH A REDUCED REMOTE SYSTEM CAPACITY. |

FIG . 3a

004160 1429950

| PARAMETER | VALUE |
|---|---|
| DOWN STREAM LINK | |
| 1) TOTAL BANDWIDTH ALLOCATED | 850MHz |
| 2) FREQUENCY RE-USE, SECTORS PER CELL | FREQUENCY RE-USE OF 1, 4 SECTORS/CELL |
| 3) DATA FORMAT | CONTINUOUS CARRIER TDMA |
| 4) NUMBER OF CARRIERS TOTAL & CARRIERS/SECTOR | 24 CARRIERS TOTAL, 6 CARRIERS/SECTOR |
| 5) CARRIER SPACING | $1/T = F =$ TRANSMITTED DATA RATE OF THE CHANNEL |
| 6) DATA RATE: PAYLOAD, TRANSMITTED | OC-1 (51.84 Mbps), 52.2 Mbps |
| 7) DATA MODULATION | QPSK |
| 8) DATA CODING | RATE 7/8 CONVOLUTIONAL ENCODING, INTERLEAVED, AND (60,54) REED SOLOMON CODING |
| 9) TRANSMIT CELL DATA STRUCTURE | 1 SYNC BYTE, 5 BYTE HEADER, 48 BYTE ATM PAYLOAD, 6 BYTE RS BITS |
| UP STREAM LINK | |
| 1) TOTAL BANDWIDTH ALLOCATED | 150 MHz |
| 2) FREQUENCY RE-USE, SECTORS PER CELL | 1 IN 4 FREQUENCY RE-USE, 4 SECTORS/CELL |
| 3) DATA FORMAT | BURST CARRIER, BYTE SYNCHRONOUS TDMA |
| 4) NUMBER OF CARRIERS TOTAL & CARRIERS/SECTOR | 8 CARRIERS TOTAL, 2 CARRIERS/SECTOR |
| 5) CARRIER SPACING | $2/F' = 2F'$, WHERE $F' =$ TRANSMITTED DATA RATE OF THE CHANNEL |
| 6) DATA RATE | $1/2$ OC -1 (25.92 Mbps), 26.1 Mbps |
| 7) DATA MODULATION | ALPHA = 0.25 ROOT-RAISED COSINE FILTERED QPSK |
| 8) DATA CODING | (60,54) REED SOLOMON CODING |
| 9) TRANSMIT CELL DATA STRUCTURE | 1 SYNC BYTE, 5 BYTE HEADER, 48 BYTE ATM PAYLOAD, 6 BYTE RS BITS, FOLLOWED BY A 1 BYTE GUARD SPACE |

FIG. 3b

004160" T429960

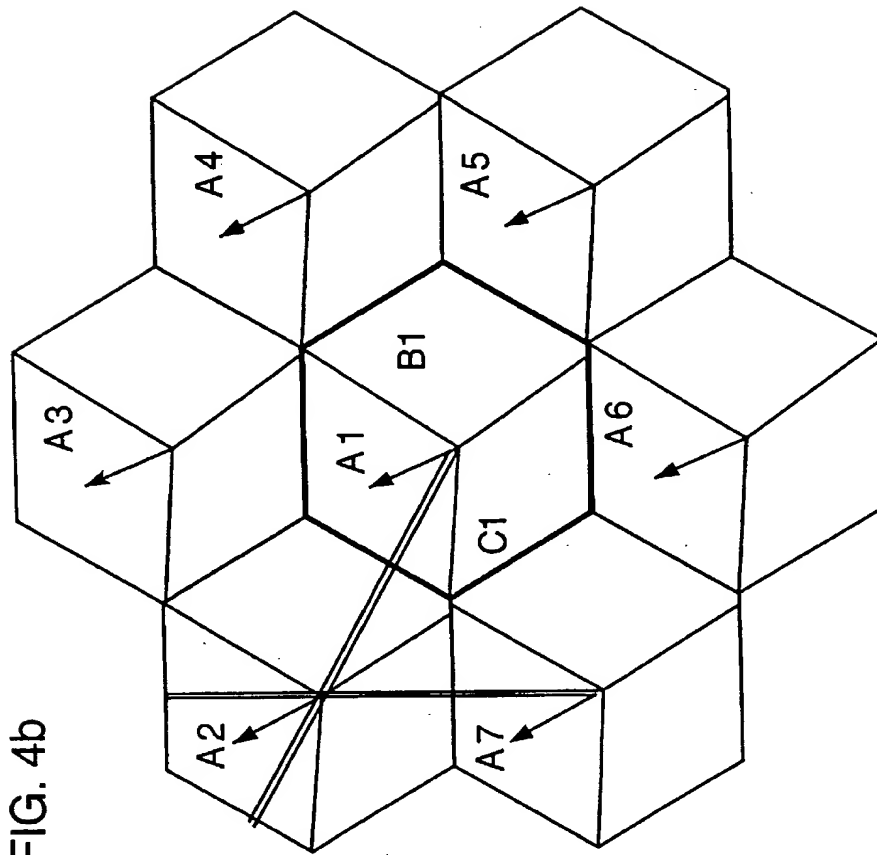


FIG. 4b

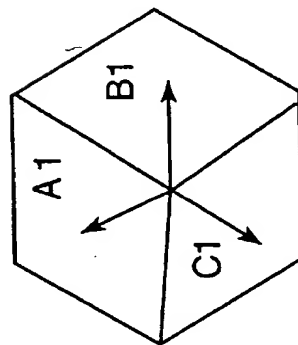
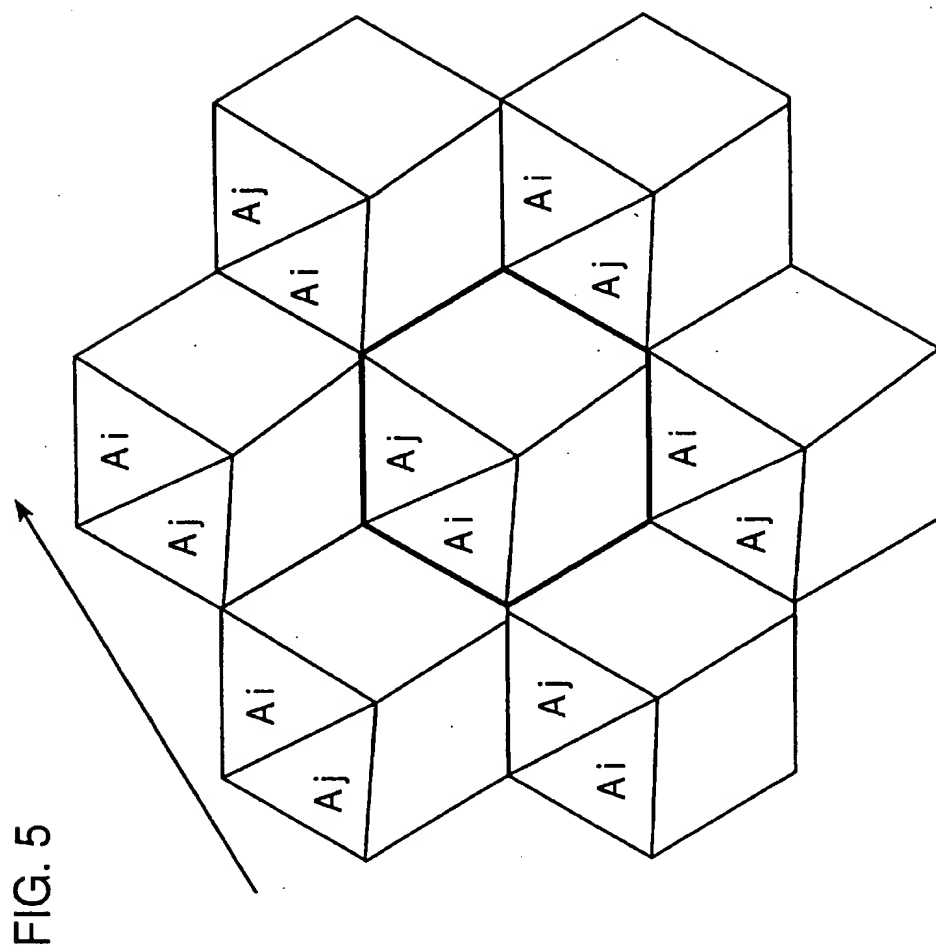


FIG. 4a



004760" 74229960

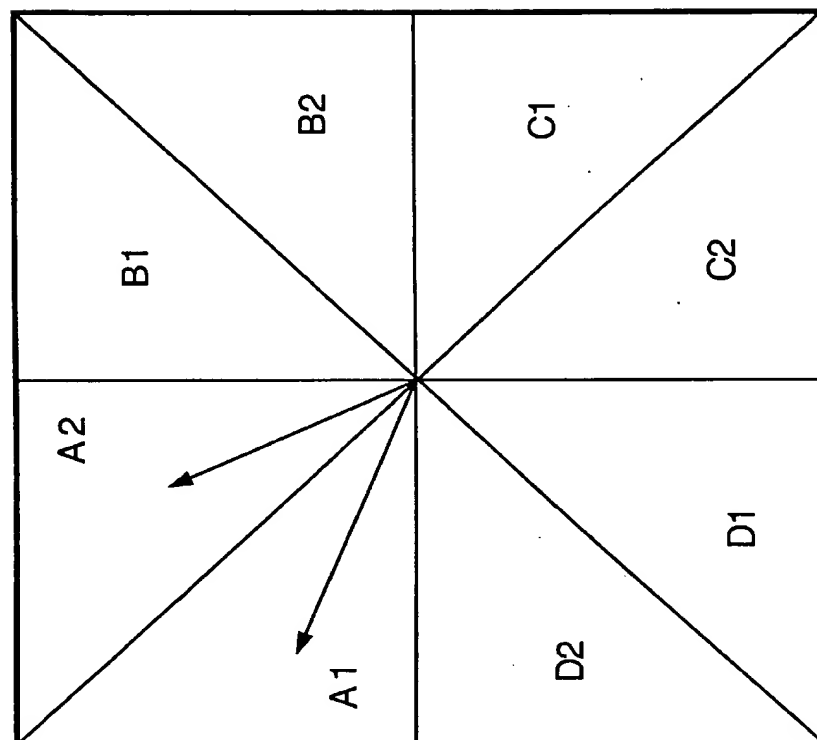


Figure 6a

004160 " 1423950

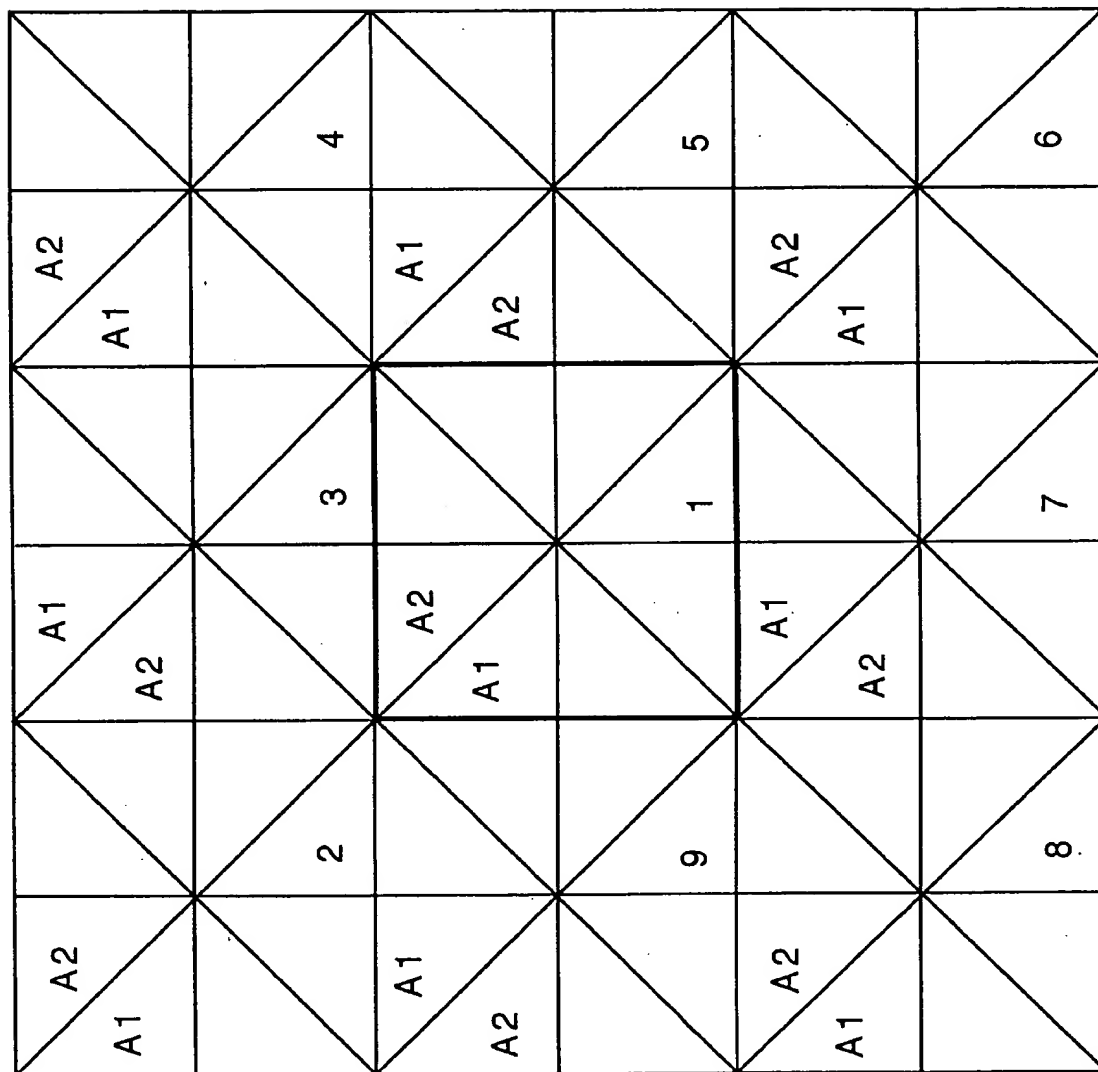


Figure 6b

004760"TH29960

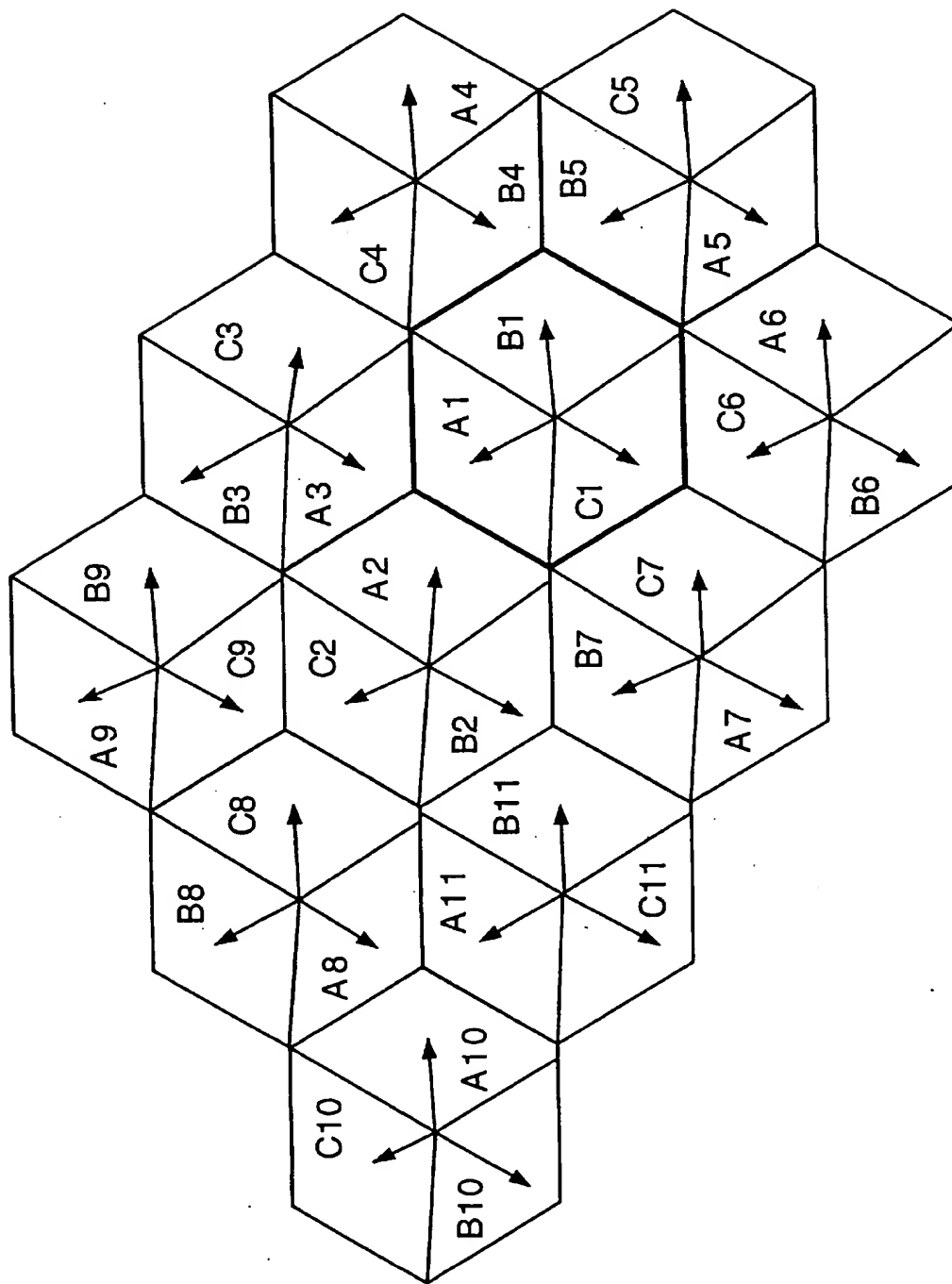


Figure 7

004160" 1429960

004750" TH229160

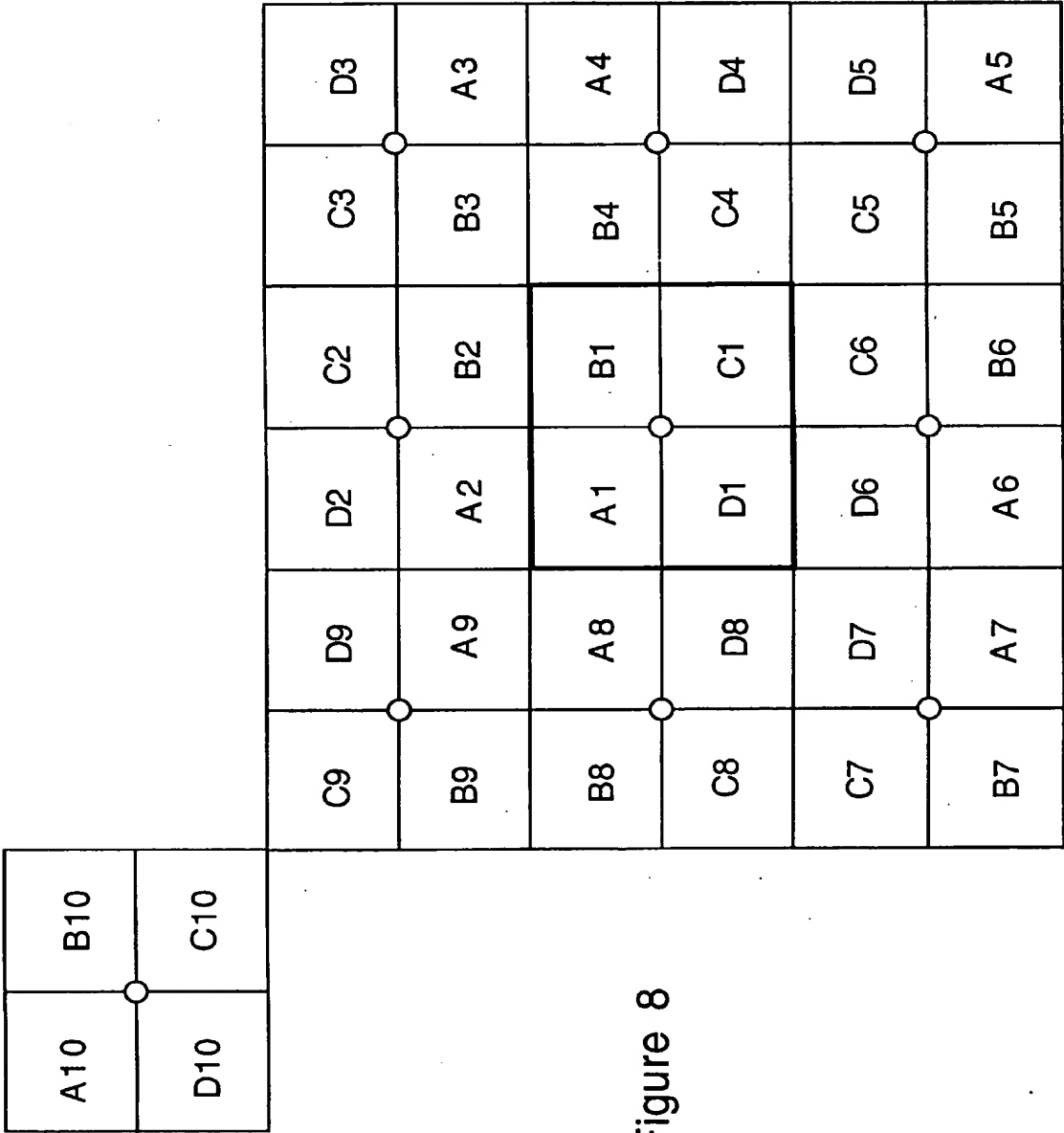


Figure 8

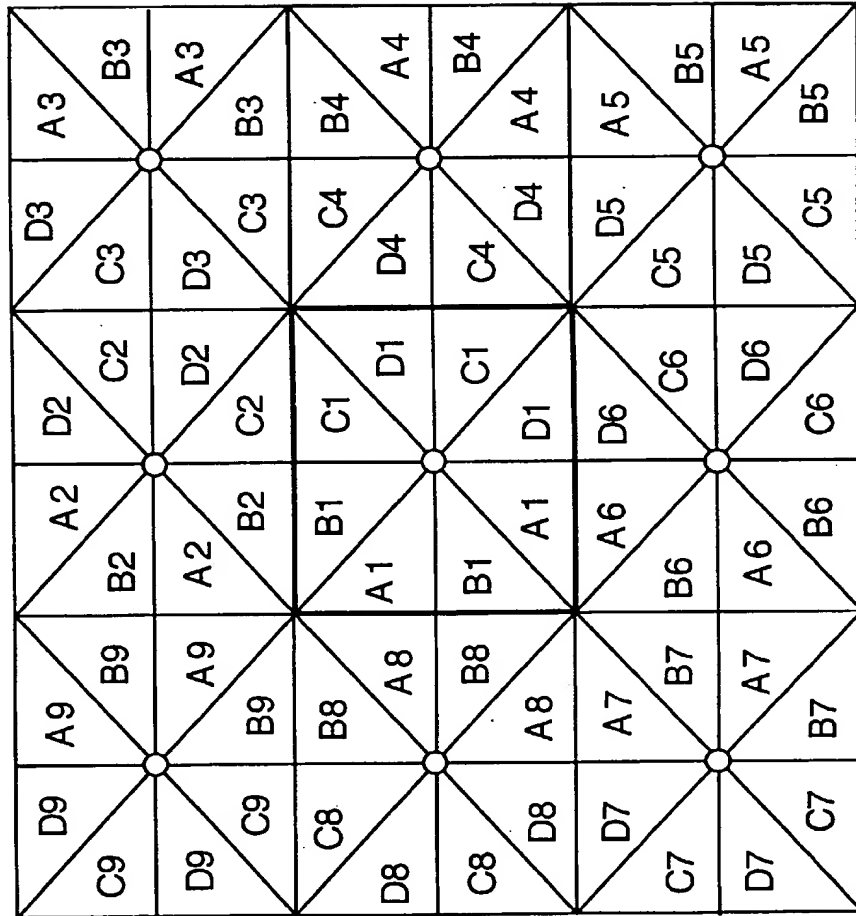


Figure 9

004160" FIG. 29960

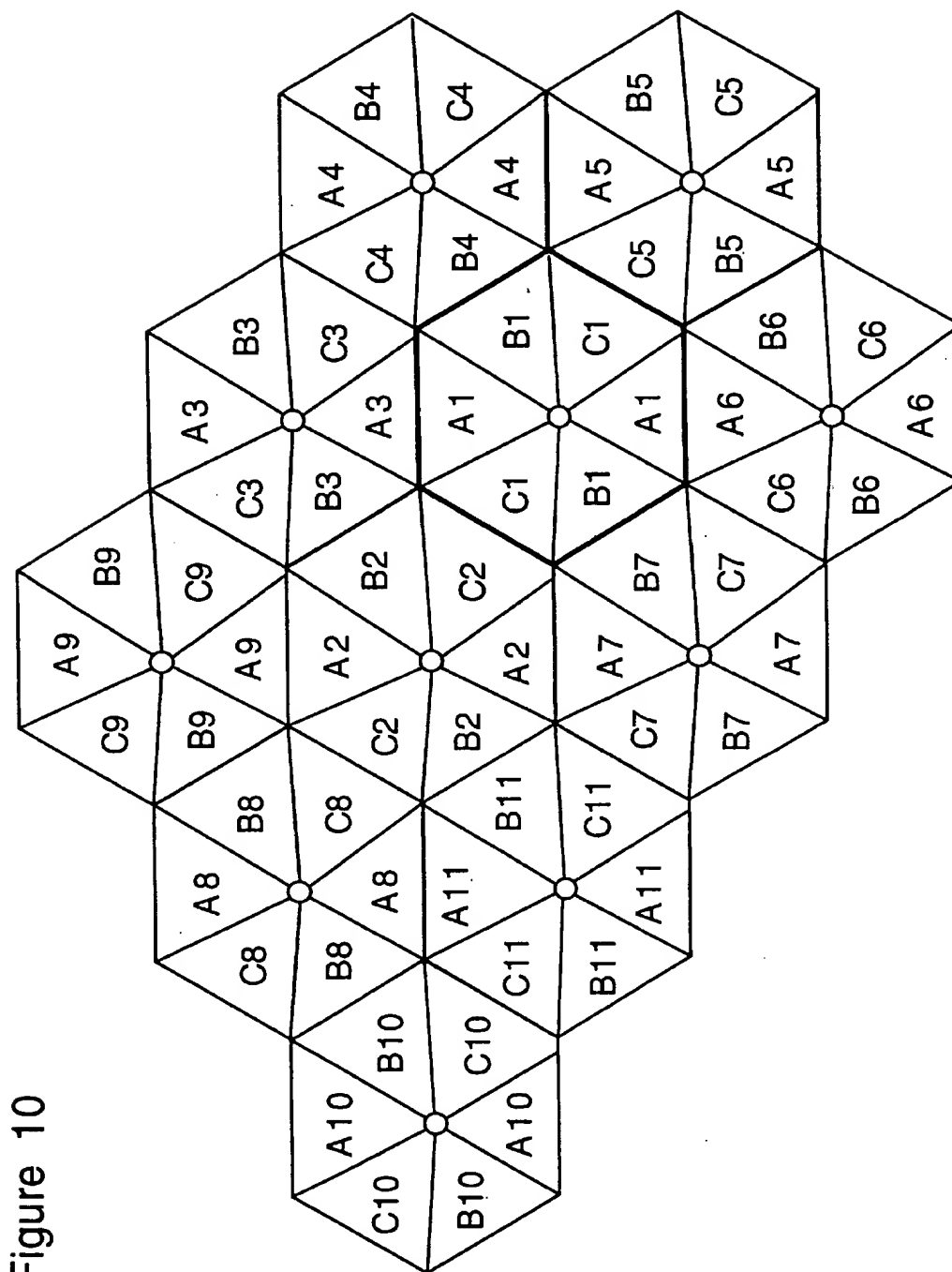


Figure 10

004T60" TH29950

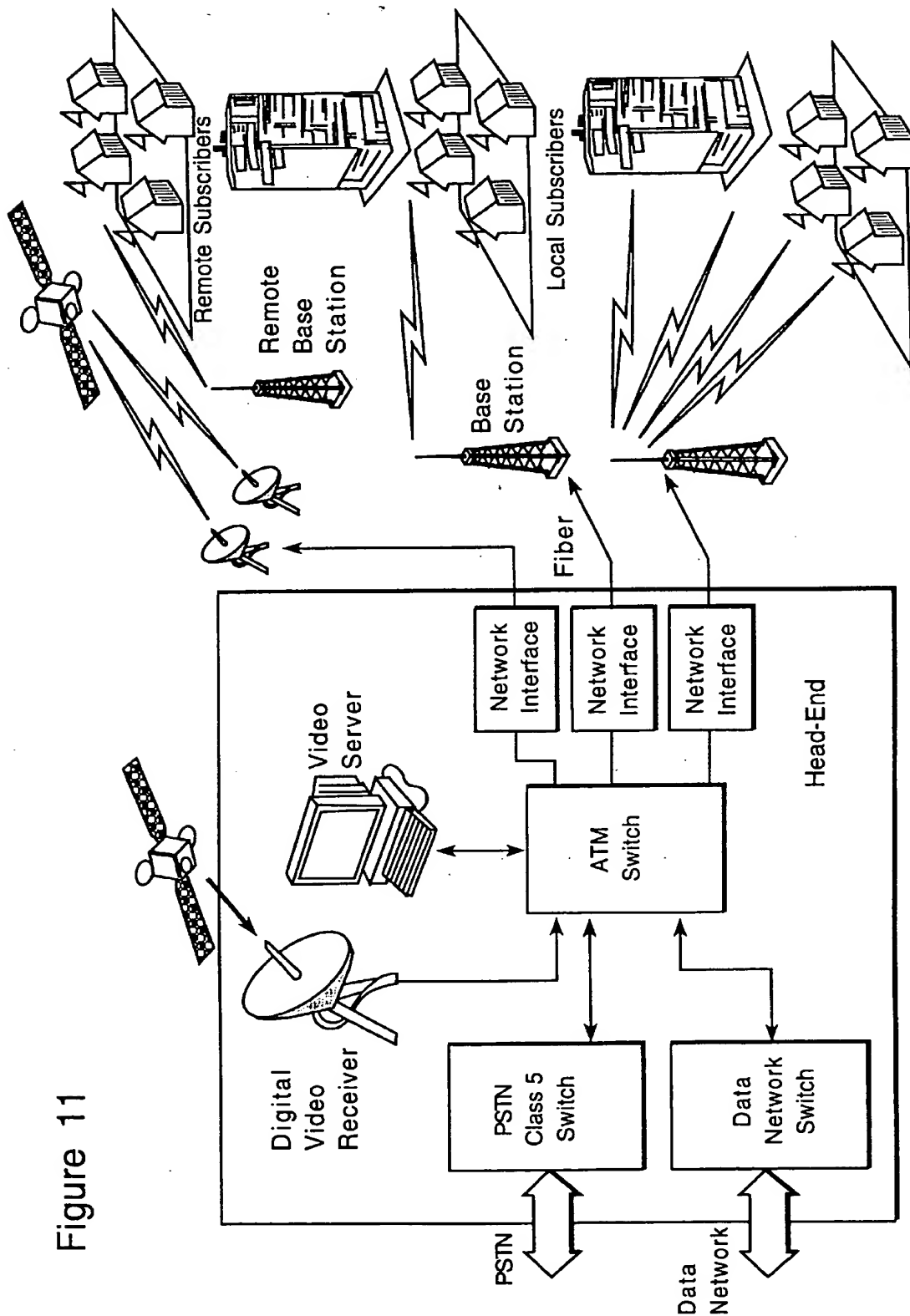


Figure 11

004760"TH29960

004760" 7429960

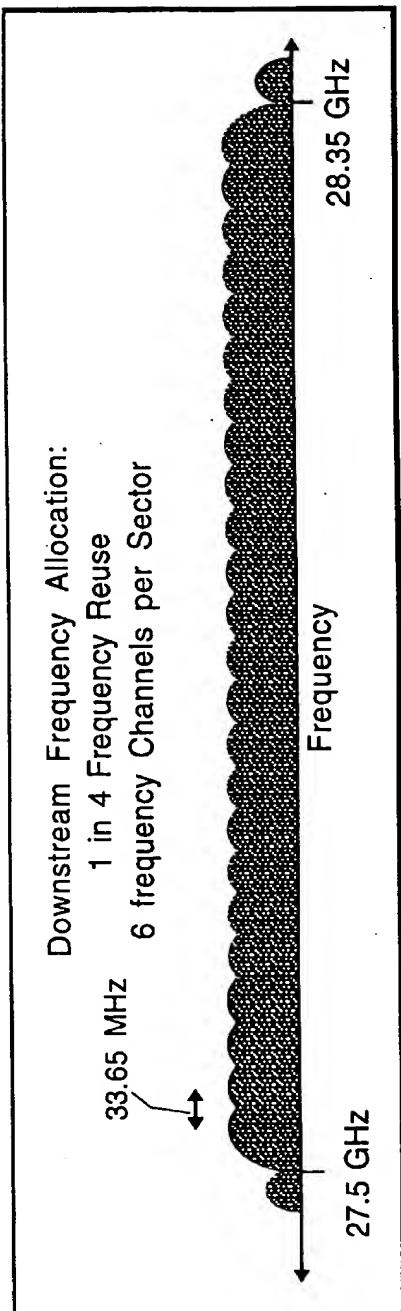


Figure 12a

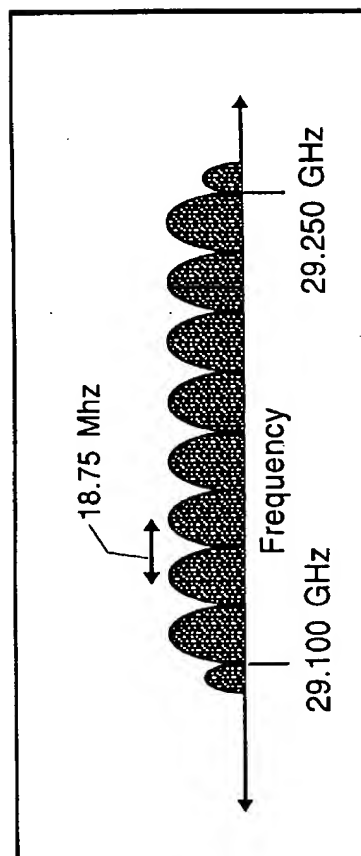
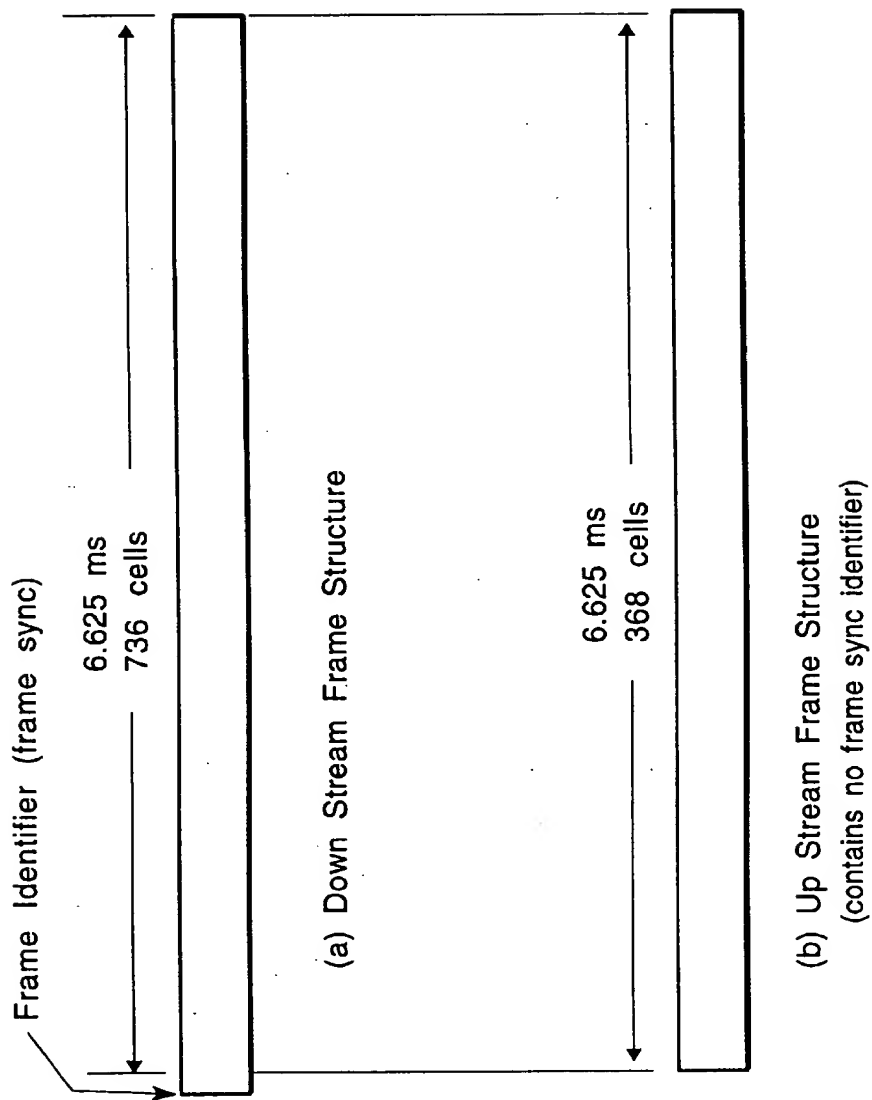
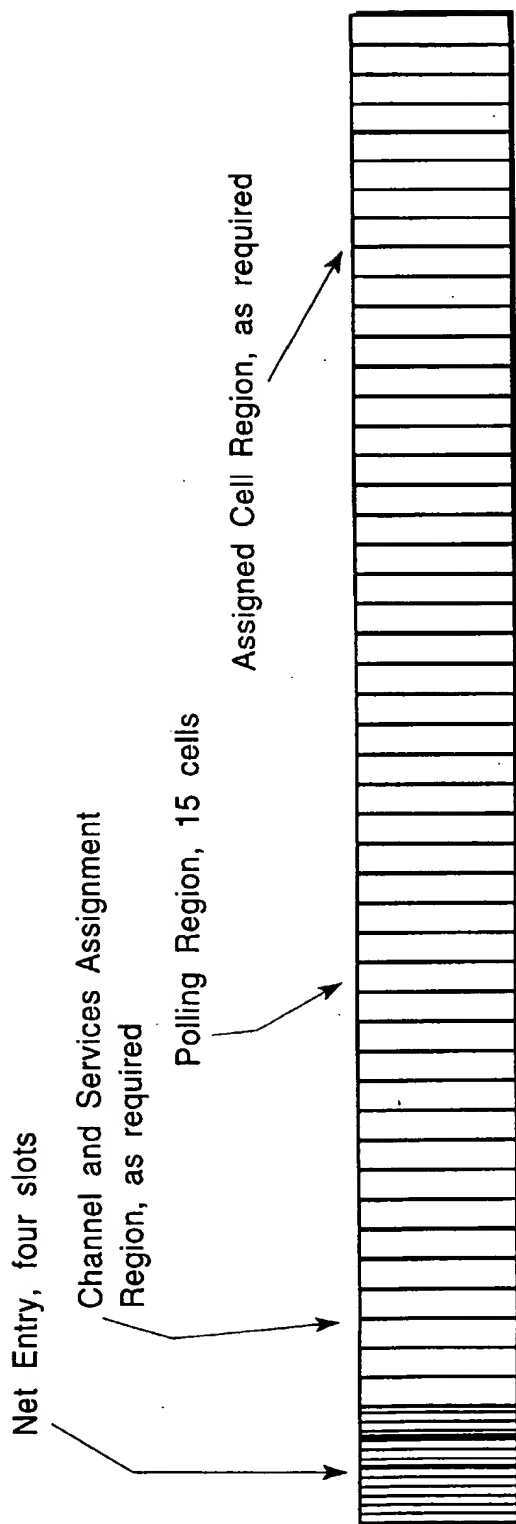


Figure 12b

Figure 13



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Note: A guard space of one byte size is left between successive cells

Figure 14

| MESSAGE TYPE | SOURCE | DESTINATION | FUNCTION |
|--|------------|-------------|---|
| INITIALIZATION REQUEST, FIGURE 14(a) | SUBSCRIBER | HEAD END | SUBSCRIBER ISSUES REQUEST FOR NET ENTRY FUNCTION TO BE INITIATED |
| INITIALIZATION RESPONSE, FIGURE 14 (d) | HEAD END | SUBSCRIBER | ISSUE INITIAL POWER, TIMING, AND FREQUENCY ADJUSTMENTS TO SUBSCRIBER, AND TRANSFER SUBSCRIBER OPERATIONS TO CHANNEL & SERVICES ASSIGNMENT REGION |
| TERMINATE REQUEST FIGURE 14 (a) | SUBSCRIBER | HEAD END | SUBSCRIBER ISSUES REQUEST FOR TERMINATION OF ONGOING SERVICES |
| TERMINATE COMMAND (a). FIGURE 14 (b) | HEAD END | SUBSCRIBER | HEAD END ISSUES COMMAND TO SUBSCRIBER TERMINATING ONGOING SERVICES AND ALL UP STREAM TRANSMISSIONS |
| TERMINATE COMMAND (b), FIGURE 14 (b) | HEAD END | SUBSCRIBER | HEAD END INDEPENDENTLY ISSUES COMMAND TO SUBSCRIBER TERMINATING ONGOING SERVICES AND ALL UP STREAM TRANSMISSIONS BECAUSE OF DEPICTED IMPROPER & REAL TIME UNCORRECTABLE SUBSCRIBER OPERATING CONDITIONS |
| SERVICE REQUEST, FIGURE 14 (c) | SUBSCRIBER | HEAD END | SUBSCRIBER IDENTIFICATION OF & REQUEST FOR INITIATION OF NEW SERVICES REQUIRED SERVICES |
| SERVICE REQUEST RESPONSE, FIGURE 14 (d) EXPANDED | HEAD END | SUBSCRIBER | CONTINUE REFINEMENT OF POWER, TIMING, AND FREQUENCY ADJUSTMENTS TO SUBSCRIBER, ISSUE DEFINITION OF SERVICES APPROVED FOR USE BY SUBSCRIBER AND TRANSFER SUBSCRIBER OPERATIONS TO ASSIGNED CELL REGION |
| STATUS REQUEST AND PARAMETER ADJUSTMENT COMMAND, FIGURE 14 (d) | HEAD END | SUBSCRIBER | HEAD END COMMAND TO SUBSCRIBER REQUESTING STATUS OF OPERATIONAL EQUIPMENT, & ALL IN-HOME MONITORING SERVICES, AND POWER, TIMING, & FREQUENCY ADJUSTMENT COMMANDS IF REQUIRED |
| REQUEST TO EXECUTE A FILE TRANSFER, FIGURE 14 (a) EXPANDED | SUBSCRIBER | HEAD END | THERE WILL BE TIMES THAT FILES OF DATA WILL BE TRANSFERRED FROM THE SUBSCRIBER TO THE HEAD END. THIS REQUEST DEFINES THE FILE DATA AND THE NEED TO INITIATE THIS OPERATION. |
| COMMAND TO PRE-PARE TO RECEIVE A DATA FILE. FIGURE 14 (b) EXPANDED | HEAD END | SUBSCRIBER | COMMAND TO SUBSCRIBER TO PREPARE FOR RECEPTION OF A DATA FILE, & DEFINITION OF HOW FILE WILL BE TRANSFERRED |

FIG. 15

00460" 1429960

Figure 16a

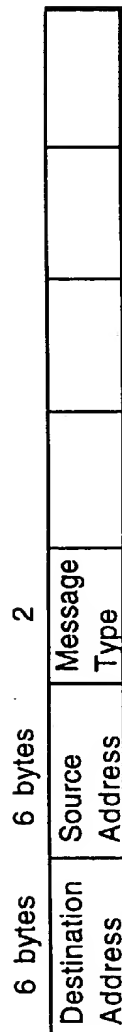


Figure 16b

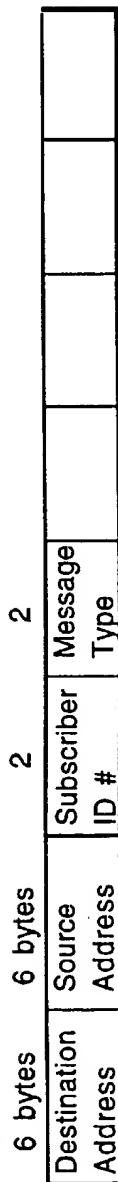


Figure 16c

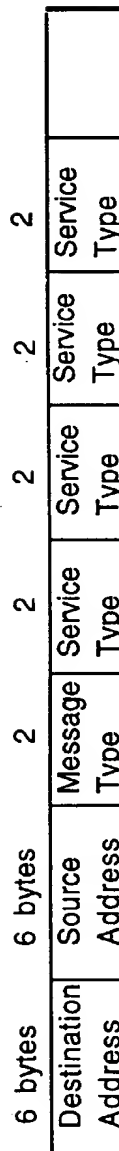
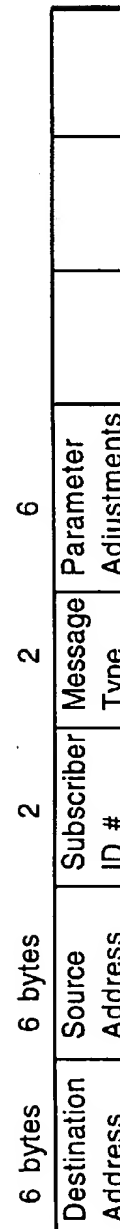


Figure 16d



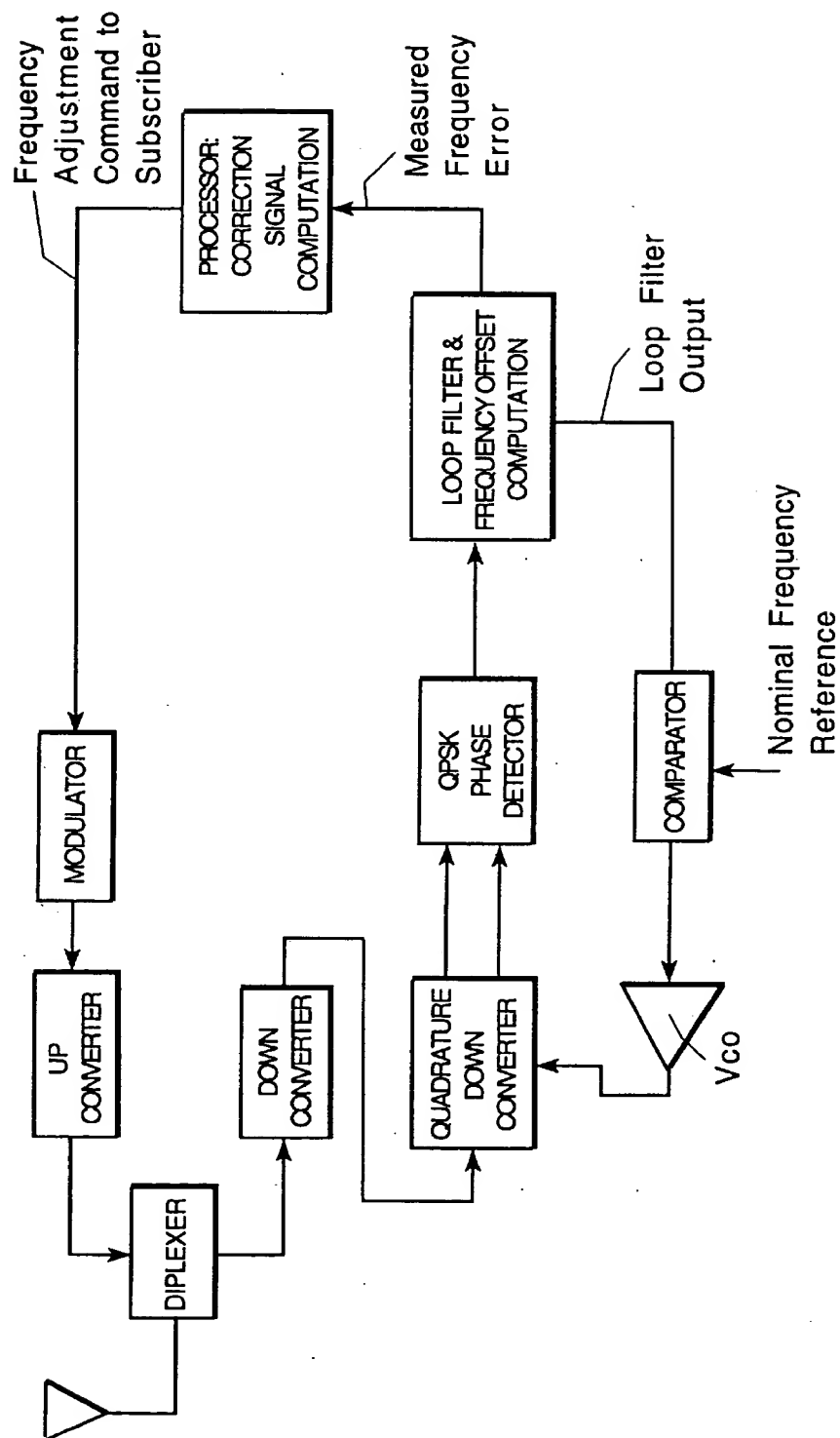


Figure 17

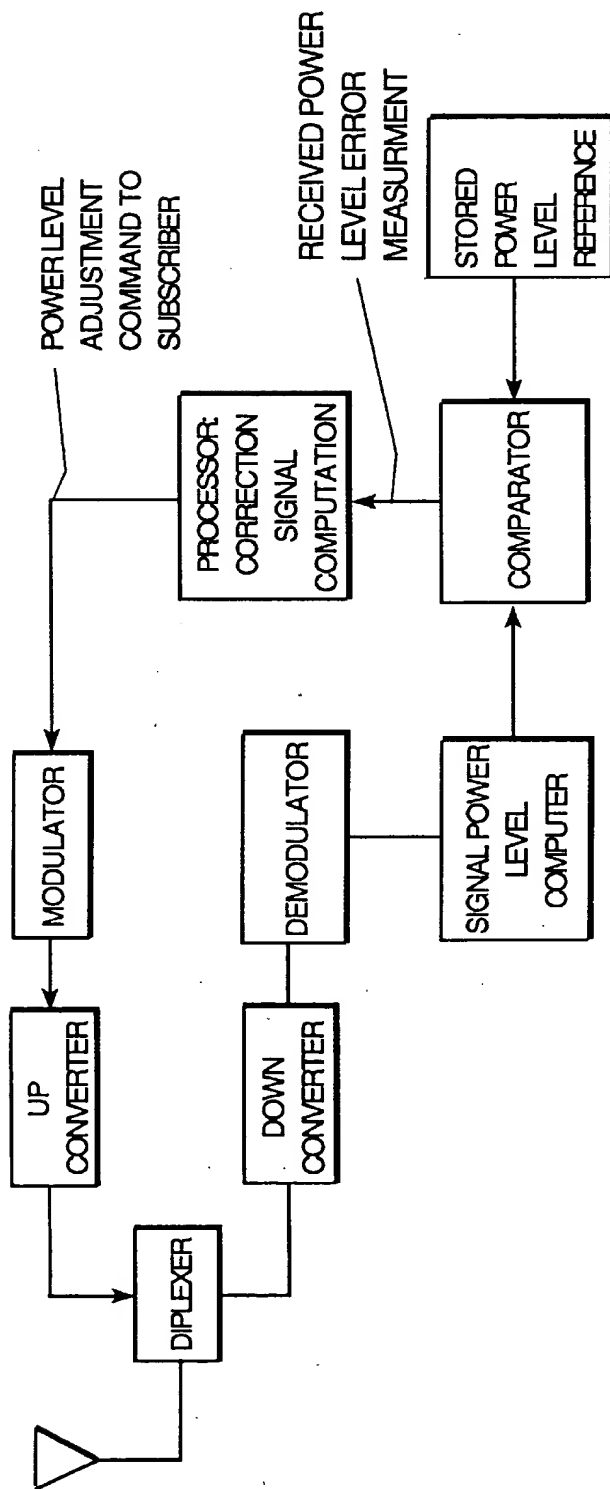


Figure 18

004T60" F4/29360

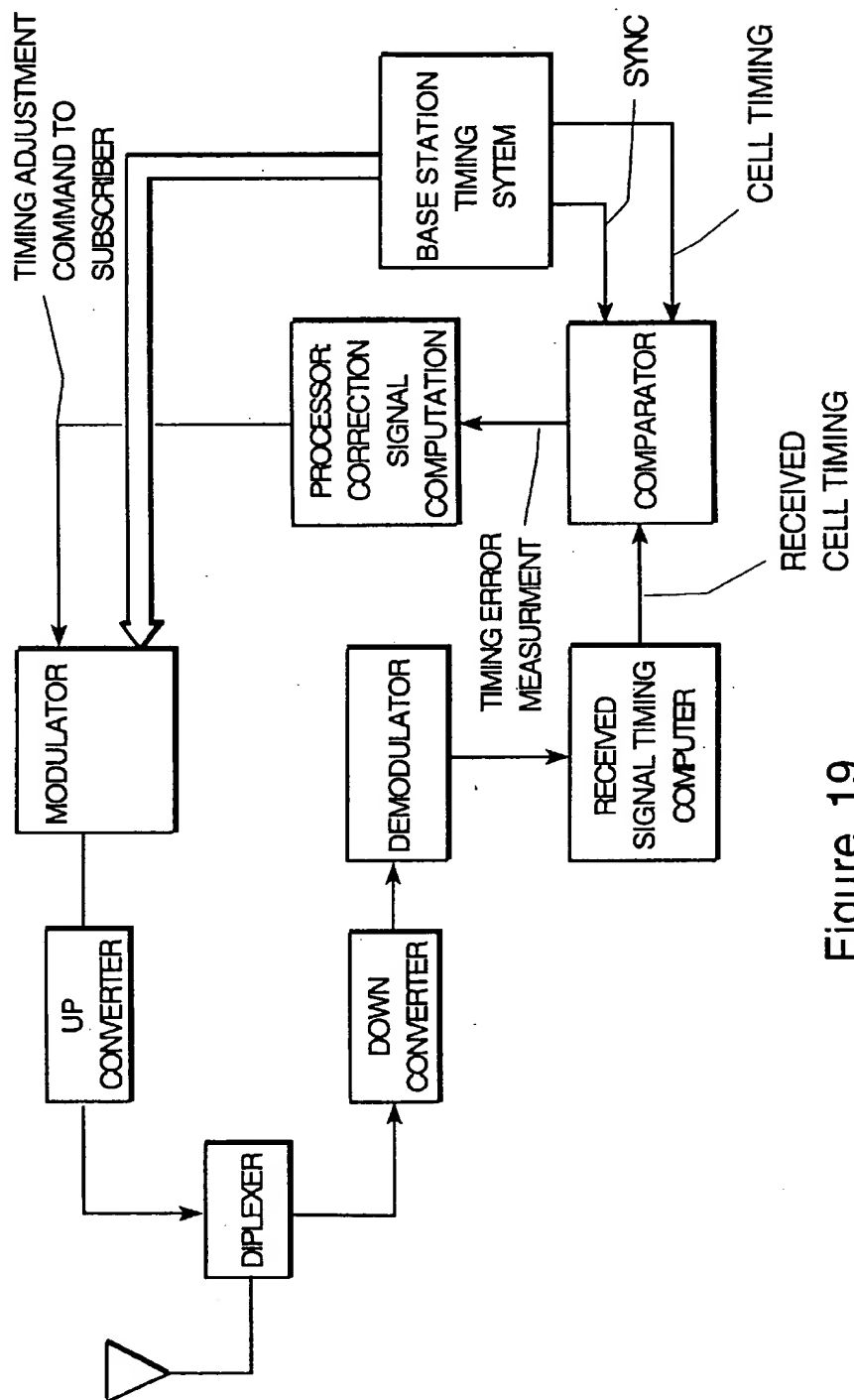


Figure 19

Figure 20

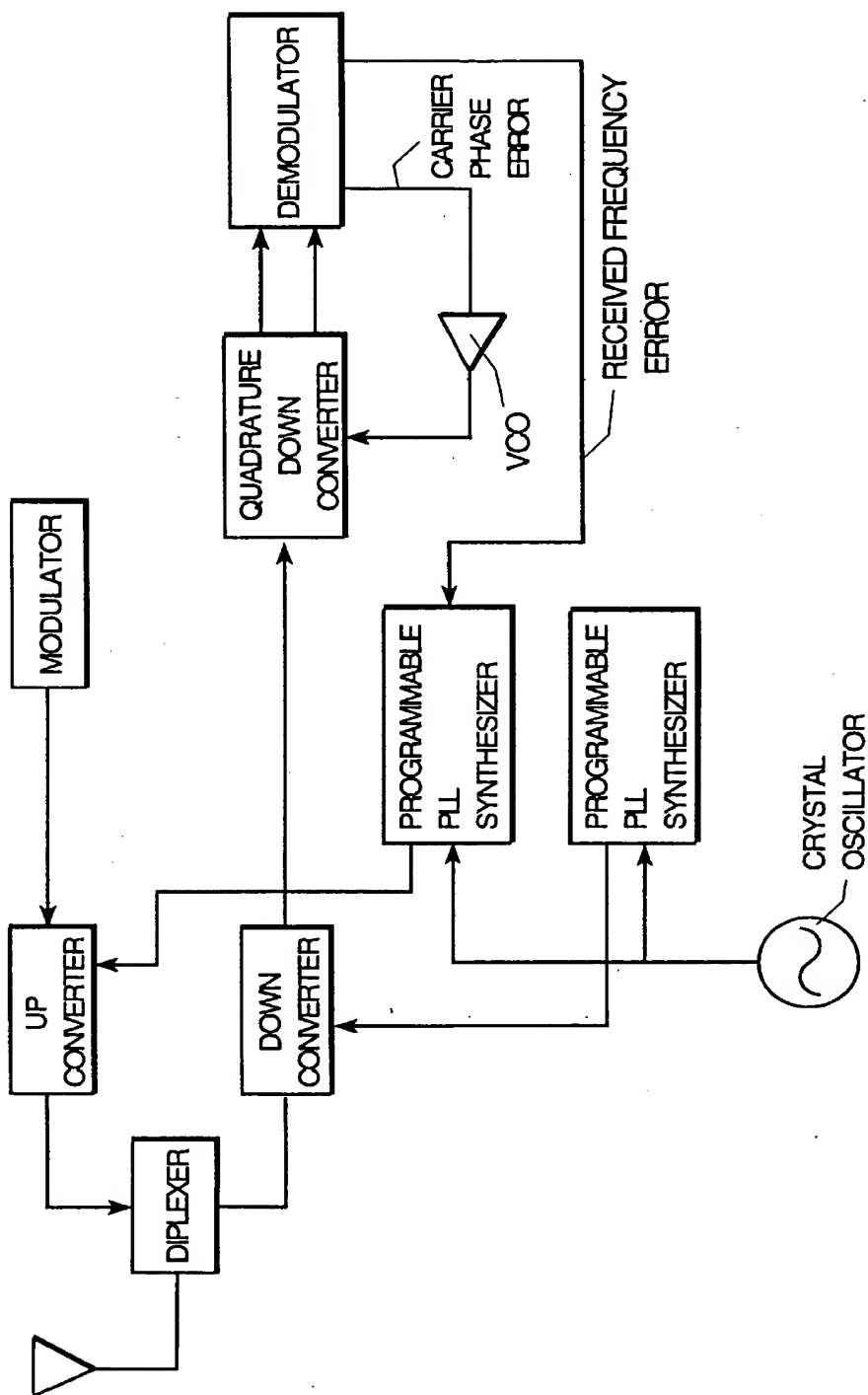


Figure 21

